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NAVY MEDICINE IN FOCUS

NeuroTrauma Department Seeks to Improve Brain Function

BY VJOHNSON – APRIL 17, 2014

POSTED IN: FEATURES

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Dr. Saad Habib Mullah (pictured) and Dr. Biswajit Saha are measuring brain tissue oxygenation using phosphorescence quenching to evaluate to efficacy of blood substitutes in the treatment of traumatic brain injury. (Photo by Mikelle D. Smith)

The NeuroTrauma Department at the Naval Medical Research Center (NMRC) conducts research on a variety of topics pertinent to the protection, care, and resuscitation of combat casualties, primarily those occurring in austere circumstances with anticipated delay to definitive care.

The Department maintains three major programs:

-The Blast Research Program consists of human clinical and operational research together with several laboratory model systems.

-The Operational Medicine Program focuses primarily on emergent militarily relevant issues that could be immediately deployed onto the battlefield. Collaborative efforts with senior trauma surgeons at the Walter Reed National Military Medical Center strengthen the translational value of laboratory evaluations.

Research efforts in the Polytraumatics Program are designed to address pre-hospital and early-hospital treatment of combat trauma involving traumatic brain injury (TBI) with and without concomitant injuries (polytrauma) such as hemorrhagic shock (HS), acute respiratory distress syndrome or soft tissue and bone injuries.

For patients with TBI, mortality doubles when hypotension and hypoxemia, hallmarks of severe hemorrhagic shock (HS), occur concurrently. While blood remains the ideal fluid to treat TBI/HS casualties, deployment of blood is logistically costly, complex, requires additional training, and is rarely available in forward combat areas. There is virtually no field-compatible intervention known that improves final outcome. A field-deployable, low-volume, temperature-stable Oxygen Therapeutic (OT) agent that enhances oxygen delivery to the brain may benefit the early (pre-hospital) care of TBI casualties with and without concurrent HS. Such an OT agent could save lives and preserve neurologic function in combat casualties.



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The Polytraumatics Program is evaluating seven currently obtainable OTs for their potential to oxygenate brain tissue and reduce neurological damage in laboratory model with and without moderate TBI.

Vasoconstriction, a secondary measurement parameter, has been a major safety concern in older generation oxygen therapeutics, but our initial study in a laboratory model indicated that a number of these newer OTs have little or no vasoconstricting effects on brain vessels.

It is our goal to investigate whether or not this will translate into a safe and effective drug treatment. Any promising drugs identified in this study will be positioned for further investigation in a more sophisticated TBI laboratory model.

The overall goal of the NeuroTrauma Department is to develop, or support development of, new improved field-capable therapies and regimens of care that will save lives on the battlefield, en route to definitive care, and during early emergency care.



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